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AUTHOR Yang, Ok Seung; Michael, William B.
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ABSTRACT

The effectiveness of the verbal plan and review training (VPRT) program in enhancing the reflectivity of 115 economically disadvantaged preschoolers who qualified for a Head Start program but were enrolled at the University of Southern California School for Early Childhood Education was evaluated. Adapted from the curriculum model of Weikart, Hohmann, and Rhine (1981) and based on Smilansky's (1966) three-part sequence, the VPRT program involves three segments: (1) verbalization of a plan embodying free choice for play-related activity; (2) commitment to activities to be pursued in the classroom setting; and (3) oral review of results of activities in the context of teacher/student interaction. In a quasi-experiment, five intact classes were assigned to a treatment group, and three intact classes were assigned to a control group which received traditional instruction. Results suggested that participation in VPRT significantly influenced the manifestation of reflectivity of disadvantaged preschool children, VPRT procedures were more beneficial to boys than to girls, and VPRT showed promise as a cost-effective procedure for increasing the reflectivity of disadvantaged preschool children in classroom settings. (Author/RH)

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THE EFFECT OF VERBAL PLAN AND REVIEW TRAINING ON PRESCHOOLERS' REFLECTIVITY

Ok Seung Yang

Duksung Women's College

Seoul, Korea

William B. Michael

University of Southern California

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Running head: THE EFFECT OF VERBAL PLAN AND REVIEW TRAINING

Abstract

The underlying objective of this study was to evaluate the effectiveness of the verbal plan and review training (VPRT) program in enhancing the reflectivity of economically disadvantaged preschoolers in a Head Start program. Adapted from the curriculum model of Weikart, Hohmann, and Rhine (1981) and based on Smilansky's (1966) three-part sequence of planning-doing-evaluating, the VPRT program involves three segments of (a) verbalization of a plan embodying free-choice for play-related activity (verbal plan), (b) commitment to activities to be pursued in the classroom setting (action), and (c) a verbalized (oral) review of results of the actual activities accompanied by interaction with the teacher (verbal review). In the quasi-experiment, five intact classes were in the experimental (treatment) group (n = 74), and three intact classes were in the comparison group (n = 41) that was exposed to traditional instruction. It was concluded that (a) participation in VPRT influences significantly the manifestation of reflectivity of disadvantaged preschool children in terms of greater latency and lower error scores, (b) VPRT procedures appear to be more beneficial to boys than to girls in reducing error scores, and (c) VPRT shows promise as a cost-effective procedure for increasing reflectivity of disadvantaged preschool children in naturalistic classroom settings.

The Effect of Verbal Plan and Review Training on Preschoolers' Reflectivity

During the 1960s many psychologists and developmental psychologists alike (Luria, 1961, 1985; Piaget, 1947; Slobin, 1979; Vygotsky, 1962) recognized the importance of the role of linguistic communication in early childhood. They contended that school should provide children with an environment in which individual children are expected to participate actively in expressing their purposes and to talk over personally meaningful experiences. Interpersonal use of language in this view has cognitive consequences.

In addition, other proponents of this position have reported that economically disadvantaged children, as compared to advantaged children, tend to receive less verbal instruction through which to express their own purposes, aims, and intentions at home (Blank & Solomon, 1969; Hess & Shipman, 1965; Mumbauer & Miller, 1970). As a result, disadvantaged children may fail to use language to express emotions, intentions, and desires or to consider alternatives, although their language is as complex as the language of advantaged children (Dittmar, 1976; Miller, 1982). One overriding implication is that teaching is supporting the development of the child's ability to subordinate actions to

speech. As such, the primary goal of teaching is to promote the "planning" function of private speech on the part of the child.

Within this context, David P. Weikart and his associates developed the Cognitively Oriented Curriculum model as an open framework which is basically conceived of as an alternative child-centered curriculum approach, based on progressive ideology and cognitive developmental theory (Hohmann, Banet, & Weikart, 1979; Weikart, 1972a; Weikart, Hohmann & Rhine, 1981; Weikart, Rogers, Adcock, & McClelland, 1971). Social behavior and other traditional concerns of preschools are not crucial to this curriculum model. Rather, the Cognitively Oriented Curriculum emphasizes verbal stimulation and interaction, sociodramatic play, and learning concepts through activity (Weikart, 1972a). As the curriculum is designed to develop the child's basic cognitive processes, it is relatively free of cultural bias and specific linguistic criteria (High/Scope Educational Research Foundation, 1979; Hohmann et al., 1979; Weikart, 1972a).

Within this developmental frame of reference, the Cognitively Oriented Curriculum has further incorporated a three-part sequence of planning-doing-evaluating, first described by Sara Smilansky in 1966. The emphasis in this three-part sequence is on (a) the child's verbal expression of advance planning, (b) working, and (c) verbal description of the results of the actions.

The essence of Smilansky's three-part sequence model is to teach children to plan activities to be completed, to describe these activities, and to evaluate their outcomes in verbal statements.

The major theme underlying the teaching model is the modification of impulsivity. The statement by Weikart et al. (1981) is evidence or the fact that

> To increase the attention span of the child and to help him plan and execute self-selected activities, the Cognitively-Oriented Curriculum seeks to help him bring his behavior more under his conscious control. This goal is called "impulse control," and to this end, the curriculum incorporates a three-part sequence suggested by Sara Smilansky. (p. 65)

From this quotation, one can begin to appreciate the important role that self-regulation, which is also the central concept in self-management, has played in Smilansky's account of individual psychological processes. (For a review of self-regulation, one may consult Karoly and Kanfer [1982] and Patterson [1982].)

The statement also implies active participation of individual children in goal selection and evaluation. Convincing arguments for attending to individual differences in applied educational research, however, have been offered repeatedly by cognitive developmental psychologists. There is recent evidence that, developmentally, the preschool child is not capable of observing the self as an object or internalized evaluation (Harter, 1982). This point of view leads to an emphasis on the child's level of commitment, an important determinant in the successful use of self-regulation paradigms with

adults; namely, development of the child's personal awareness of actions and ideas.

How could this developing awareness on the part of the child be applied in actual preschool settings? One very helpful tactic in making concrete this self-regulation in the learning process is to provide children with opportunities not only to articulate verbally a plan with the identification of the steps involved in carrying out what is called verbal plan, but also to recall what they did at free-choice time by talking about their actions so as to comprehend the direct relationship of their actual accomplishments with their original plan--a process known as verbal review. Under this condition, verbal review of commitment seems likely to evoke a process of self-evaluation (Hohmann et al., 1979). It is perhaps not surprising that the High/Scope Cognitively Oriented Curriculum developers have included verbal plan and review instruction as a modified feature of Smilansky's teaching model. However, there has been no research to examine the effectiveness of this instruction (D. P. Weikart, personal communication, August 9, 1984).

Although Smilansky's (1966) teaching model could be seen as a precursor of verbal plan and review instructions, lack of direct empirical tests clearly leaves room for further study of such instructional techniques. It is expected that additional research might serve not only to clarify the potential pragmatic significance of verbal plan and review training in relation to preschool children's cognitive processes--specifically, reflectivity--but also to provide evidence to support or challenge the common assumption

that development of the ability of disadvantaged children to exercise verbal control over their own actions in learning at the preschool level can be expected to promote their reflection in problem-solving. The present investigation is a response to the need for empirical study regarding the effectiveness of verbal plan and review procedures, as one cognitive teaching-learning process variable, at the preschool level for the improvement of reflective problem-solving on the part of the disadvantaged preschool children.

In the current study, reflection is defined as a process in which a child pauses to consider and to evaluate the quality of his/her thinking. Furthermore, reflection, as a problem-solving stage, influences accuracy of peceptual processing (Drake, 1970; Kilberg & Siegel, 1973; Siegel, Kirasic, & Kilberg, 1973; Zelniker & Jerfrey, 1976), memory (Borkowski, Peck, Reid & Kurtz, 1983), and hypothesis testing and generation (Adams, 1972; Kagan, Pearson, & Welch, 1966a; McKinney, 1973; Mitchell & Ault, 1979). A child who solves problems with much regard for the consequences is said to be reflective; a child who takes less time to evaluate the quality of his/her idea and solutions is said to be impulsive. In other words, the reflective child, as compared with the impulsive child, is viewed as a more mature and efficient problem solver.

Purposes of the Study

The underlying objective of this study was to evaluate the effectiveness of the verbal plan and review training (VPRT) program

in enhancing the reflectivity of economically disadvantaged preschoolers. The VPRT program involved a three-part sequence of (a) verbalization of a plan embodying free-choice for play-related activity (verbal plan), (b) commitment to activities to be pursued in the classroom setting (action), and (c) a verbalized review of results ot the actual activities accompanied by interaction with the teacher (verbal review)--a program representing a modification of the one previously cited (Weikart, et al., 1981). Reflectivity was derined in terms of a latency score and an error score (the more reflective pupil in comparison with the less reflective or impulsive one snowing a tendency to take a longer period of time in responding to a stimulus situation and exhibiting a smaller number of mistakes or errors). The four major purposes of this investigation were as follows:

1. To ascertain to what extent, if any, participation in VPRT affected preschool children's reflectivity represented by measures of latency and error.
2. To determine whether exposure to VPRT resulted in differential effects on the reflectivity of boys and girls.
3. To identify the presence or absence of a significant aptitude-treatment interaction between membership in a treatment or control group and level of cognitive ability (sequential processing ability, simultaneous processing ability, or general mental processing ability) on each of the two dependent variables

portraying components of reflectivity (i.e., measures of latency and error).

4. To establish the degree of relationship, if any, of age, sex, treatment group membership, cognitive ability (sequential processing ability, simultaneous processing ability, or general mental processing ability), and pretest latency and error scores to posttest latency and error scores.

Method

Subjects and Design

Subjects were 115 children (50 boys and 65 girls), who having qualified for Head Start and State preschool programs were enrolled at the University of Southern California School for Early Childhood Education during the 1984-1985 school year. The average age for the sample was approximately 4.3 years (51.81 months). All of the children were from lower socio-economic status families, and most of the subjects had had no prior preschool education experiences.

This quasi-experiment incorporated modifications based on the results of an earlier pilot study that contrasted children who had participated over a 10-week period one hour per day in VPRT training with children who had not taken part. In the current study, five intact classes comprised the experimental (treatment) group (n = 74), and three intact classes constituted the control (no-treatment)

group (n = 41). The two groups were comparable in chronological age, general intelligence, socio-economic status, and cultural background. The mean and standard deviation of chronological age for the experimental group were 52.53 months and 4.60 months, respectively; for the control group, 50.51 months and 6.43 months, respectively. The mean intelligence score derived from the Kaufman Assessment Battery for Children (K-ABC) (Kaufman & Kaufman, 1983a) for the total group was 93.68. Of the total sample, 89 children were classified as limited English-speaking and Spanish-speaking dominant, and 26 children as English-speaking as indicated by school records.

In addition, no effort was made to assign children to particular teachers, all of whom participated on a voluntary basis. Both treatment and control classes had a uniform daily routine consisting of free choice, clean-up, a structured lesson (small-group activity), and outdoor play. Time for the VPRT program was incorporated within the daily activities of each participating class receiving the treatment during the free-choice time period of 50 minutes. Moreover both classes contained learning centers for block play, house play, art, rug play, games, cooking, and painting and construction.

Variables

Of the eight variables in the study, two were classificatory; four, independent (one being the treatment and the other three being

cognitive measures); and two, dependent (the latency and error scores indicating reflectivity). The classificatory variables, already detailed in the previous section, included chronological age and sex. The remaining six variables are described as follows:

Treatment. The first independent variable, which was participation or lack of participation in the VPRT, could be viewed as having two dichotomous levels: (a) membership in an experimental group exposed to VPRT or (b) identification with a control group not receiving VPRT. As no effort was made to alter the curriculum of the control group in any way, this section deals only with the experimental treatment program--that is with the VPRT.

Design of the VPRT specified as the treatment variable in the study was completed following the pilot study. The pilot study, which was based upon the suggestions described by the developers of the High/Scope Cognitively Oriented Curriculum (High/Scope Educational Research Foundation, 1979; Hohmann et al., 1979) and which involved 32 Head Start teachers and 250 preschool children, took place during the 1981-1982 school year. Based on the outcomes of this informal study, some elements were selected, modified, and utilized in the final design of the treatment program. The principal design elements of the VPRT are decribed briefly as follows:

1. VPRT time was integrated into the daily routine of each class during the free-choice time period of 50 minutes, within which 8 minutes were allocated for planning time (verbalization of plan),

34 minutes for free-choice time (action), and 8 minutes for review time (verbal review of commitment).

2. Planning boards and name tags were designated as the media to be used in the program, with two practical considerations pertaining to the preschoolers' interests and visibility becoming requirements that were implemented: (a) the planning board, which was labeled with photographs and materials of that learning center, should be placed at child eye-level in each center; (b) each name tag should have the child's photograph and shape which is assigned only to him/her.

3. Child dictation of plan and review (children speaking their choice and talking about results of actions aloud for the teacher to write down) were encouraged to enhance preschoolers' motivation and attention to the training. For this purpose, recording sheets were used in activities associated with both planning and review time.

4. The teacher was instructed to provide for plan and review training time during which children could identify their name tags and the names of the learning centers in their dominant language.

5. To help the child see the relation between plan and action, the child was given review time with the same teacher as the one with whom he/she planned. In practice, only a teacher (neither an assistant teacher nor a parent volunteer) would initiate and guide the child's verbalization.

6. Planning and reviewing occurred in a circle (large group situation).

7. To help the child's self-verbalization, the teacher's communication style was quite directive during the first two weeks (e.g., "Which center would you like to play in?"). When children were able to employ the learning centers' names for planning and reviewing, then the teacher used open-ended questions (e.g., "What would you like to do?", "What did you do?").

The phases and activities of the VPRT are outlined in Table 1. The pnases set forth show the content of the preservice training given to the treatment group teachers during a two-day training period prior to the beginning of the school year. VPRT was implemented for 10 weeks.

Three cognitive measures. Intelligence scales of the Kaufman Asessment Battery for Children (K-ABC) (Kaufman & Kaufman, 1983a) were selected to measure a child's current level of cognitive ability in terms of (a) sequential processing, (b) simultaneous processing, and (c) a combination of these two components to represent general mental processing ability. In each of the three aptitude-treatment interaction analyses involving one of the two reflectivity measures as a separate dependent variable, each of these three cognitive ability scales in turn served as the aptitude variable.

In sequential processing, the emphasis is on the serial or temporal order of stimuli involved in problem solving. Simultaneous

Table 1

Syntax of the Verbal Plan and Review Training

Phase One:
Verbalization of Plan

Child is asked to talk over a plan.

Each child sits on the rug to plan;
Teacher asks each child in the child's dominant language what he/she likes to do;
Teacher listens and prompts child as the child expresses his/her choices and plans, asks how he/she is going to carry out the plan, gives him/her time to respond, offers suggestions if he/she can not think of anything, or reminds him/her of something the child began yesterday.

Teacher records the child's initial plan and reads it back to the child.

Phase Two:
Action

Child makes a commitment.

Teacher supports child.

Teacher helps child hang his/her name tag on the planning board and work with the materials in the center the child has chosen;
Teacher supports child's plan by nodding, smiling, praising, or sharing ideas;
Teacher helps child either extend the plan or make a new plan for the remainder of free-choice period when the child has completed his/her initial plan;
Teacher helps child carry the name tag to the new planning board whenever the child moves to a new learning center.

Table 1 (continued)

Phase Three:
Verbal Review of Commitment

After clean-up, each child sitting in a circle is asked to recall and to verbalize his/her free-choice activities.

Each child takes his/her name tag from the planning board and sits on the rug;
Teacher asks each child to show things and to talk in his/her dominant language about things the child has done at free-choice period;
Teacher directs the child to relate what he/she has stated (initial plan) to what he/she has done (action);
Teacher listens and prompts each child as the child recalls, asks how he/she carried out the plans, talks briefly about what he/she was doing during free-choice period, or reads back the plan he/she made at plan time.

Teacher reinforces child for future commitment.

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processing focuses on a gestalt-like, frequently spatial, integration of stimuli when one is solving problems.

Found to be useful in testing disadvantaged black and Hispanic preschool children, intelligence scales of the K-ABC represent a relatively "nondiscriminatory assessment" (Sewell, 1983). Kaufman and Kaufman (1983b) reported that internal-consistancy reliability estimates for the three global scales (sequential processing, simultaneous processing, and mental processing) were .90, .86, and .91, respectively. The correlation between K-ABC sequential and simultaneous processing scores for preschool children was .41 ($p < .01$). Similarly, for the 115 subjects of the present study, the correlations between sequential (SEQ) and simultaneous (SIM) processing scores was .39 ($p < .01$).

Kaufman and Kaufman (1983b) suggested that the simultaneous processing ability is correlated highly with Kagan's reflection-impulsivity components represented by latency and error (Kagan, 1966a, 1966b). However, in the current study involving 115 subjects, SIM ability scores were found to be correlated -.45 ($p < .01$) with error scores, but only .17 ($p > .05$) with latency scores.

Dependent variable measures. The Kansas Reflection Impulsivity Scale for Preschoolers (KRISP) (Wright, 1971) was used to assess the efficacy of the VPRT to engender reflectivity. The KRISP is made up of five practice and ten actual test items on each of two forms (A and B). Each item consists of a standard line drawing of a common object, together with four to six similar variants, only one of which is identical to the standard figure. The subject is requested

to select and to touch the one exact copy on the array. Latency of the first decision made and the number of errors committed constituted the two scores of interest. In other words, the dependent variable, reflectivity, was represented by scores on both latency and error measures.

Agreement between Form A and Form B was moderate for latency (r = .59, p < .001) and high for error (r = .72, p < .001) (Wright et al., 1978). In particular, for 167 subjects of 3 years 7 months to 4 years 6 months, the correlations between Form A and Form B for latency and error scores were .66 and .65, respectively. Additionally, Wright et al. (1978) reported that the correlation between latency and error scores for 167 subjects of 3 years 7 months to 4 years 6 months--specifically, for Form A--was -.39 (p < .001). Similarly, in the present study involving 115 subjects, the correlation between latency and error scores on the pretest (Form A) was -.40 (p < .001).

To facilitate the interpretation of data in the tables accompanying the results, acronyms have been employed to represent the variables described. In Table 2, variable classifications are indicated along with a brief description and an accompanying code (acronym).

Table 2

Variables Used in Statistical Analyses

Variable Classification	Description	Code
Classificatory		
Sex	Male (M = 1); Female (F = 2)	SEX
Age	Chronological age (in months)	AGE
Independent (Predictor)		
Treatment Groups		GRP
	Experimental group	EXP
	Control group	CON
Cognitive Ability	K-ABC intelligence scores	
Sequential Processing Ability	Sequential processing	SEQ
Simultaneous Processing Ability	Simultaneous processing	SIM
Mental Processing Ability	General mental processing	MENTAL (SEQ + SIM)
Dependent	KRISP (Form A)	
Latency	Latency score	LAT
Error	Error score	ERR
Pretest (Covariate)	KRISP (Form B)	
Pretest Latency	Latency score	PRELAT
Pretest Error	Error score	PRERR

Administration of Instruments

All the tests used in this study, KRISP (Form A and B) and K-ABC (sequential, simultaneous, and mental processing scales) were administered individually in a quiet, private room of the preschool. For the KRISP, which was administered by the experimenter or by a trained Spanish-speaking assistant, approximately 10 minutes was used per child in a given test session. Prior to experimentation and subsequent to establishment of rapport with individual children, the examiners initiated administration of the pretest. Following the 10-week training period, the posttest was given.

The K-ABC was administered by the experimenter or by one of two Spanish-speaking school psychologists during the training period. Of 10 subtests for the intelligence scales, five subtests (i.e., Magic Window, Face Recognition, Hand Movement, Gestalt Closure, and Number Recall) were given at age three; seven (Magic Window, Face Recognition, Hand Movement, Gestalt Closure, Number Recall, Triangle, and Word Order), at age four. Administration time per child averaged about 40 minutes.

Statistical Analyses

Psychometric and other data for the 115 subjects were entered into a computer and analyzed by appropriate programs of the SPSSx package (SPSS, 1983), with the exception of the calculation of the point of intersection in the aptitude-treatment interaction

analysis, which was done with a hand calculator. This section summarizes the specific analytic designs applied to data corresponding to each of the four previously cited purposes.

For the first and second purposes of the investigation an analysis of covariance was carried out for each dependent variable representing reflectivity to determine the main effect of the VPRT program (treatment) as well as differential effects of the treatment on boys and girls. Because intact groups were used, an attempt was made in the analysis to adjust for initial group differences on pretest latency scores and on pretest error scores, which served as separate covariates.

In relation to the third purpose of the study, an aptitude-treatment interaction analysis was introduced in order to search for and identify the posible interactions between treatment group membership and cognitive ability (sequential processing ability, simultaneous processing ability, or mental processing ability) on each of the two dependent variables (latency and error) representing the components of reflectivity.

Relative to the fourth purpose, intercorrelations among all variables were found. To identify the magnitude of the relationship of each of the two dependent variables to an optimally weighted composite of independent variables and the covariate (pretest corresponding to the posttest dependent variable), a stepwise multiple regression analysis was employed.

Results

The results of this investigation are summarized within the framework of each of the four major purposes and in the order in which they were stated. In this section acronyms, which have been detailed in Table 2, are frequently employed in referring to the variables about which statistical data are reported.

Main Effect of Participation in a VPRT Program

The results of each analysis of covariance are presented in Table 3. After differences of the treatment and control groups in their average standing on the covariate were equated, the main effects associated with the latency (LAT) and error (ERR) measures were statistically significant, F (1, 110) = 5.145, p = .025 and F (1, 110) = 11.601, p = .001, respectively. Specifically, on the LAT measure the adjusted mean of 4.71 (SD = 1.82) for the experimental group was significantly higher ($p < .05$) than that of 4.01 (SD = 1.25) for the control group, whereas, on the ERR measure the adjusted mean of 5.23 (SD = 2.50) of the experimental group was significantly lower ($p < .001$) than that of 7.00 (SD = 3.48) for the control group.

Table 3

Analysis of Covariance for Testing the Main and Differential Effects of Treatment upon Latency and Error Measures

Dependent Measure	Source of Variation	SS	df	MS	F	p
LAT						
	PRELAT (Covariate)	10.961	1	10.961	4.108	.045
	GRP	13.728	1	13.728	5.145	.025
	SEX	.055	1	.055	.021	.886
	GRP x SEX	1.871	1	1.871	.701	.404
	Residual	293.513	110	2.668		
ERR						
	PRERR (Covariate)	361.802	1	361.802	68.337	.000
	GRP	61.418	1	61.418	11.601	.001
	SEX	5.180	1	5.180	.978	.325
	GRP x SEX	32.160	1	32.160	6.074	.015
	Residual	582.381	110	5.294		

Note. On the latency measure, observed and adjusted means for the experimental group were 4.74 and 4.71, respectively; for the control group, 3.96 and 4.01, respectively. On the error measure, observed and adjusted means for the experimental group were 5.14 and 5.23, respectively; for the control group, 7.17 and 7.00, respectively.

Differential Effects of Participation in VPRT Program on Boys and Girls

The analysis of possible differential effects of the VPRT program for sex also is revealed in Table 3. With respect to LAT and ERR variables, no statistically significant differences between the means of the subsamples of boys and girls were found, F (1, 110) = .021, p = .886 and F (1, 110) = .978, p = .325. In the instance of the LAT variable, no statistically significant interaction occurred between sex and memberships in the experimental or control group, F (1, 110) = .701, p = .404, but in the case of the ERR variable, the interaction was signficant, F (1, 110) = 6.074, p = .015. In the experimental group, the means for boys and girls were 4.93 and 5.27, respectively. In the control group, respective means for boys and girls were 8.19 and 6.10.

Relationship of Age, Sex, Treatment, Cognitive Ability, and Pretest Scores to Each Dependent Variable

The intercorrelations among all variables (classificatory, independent, and dependent) are presented in Table 4 in order to give the reader some idea of the complex interdependencies of the variables in the regression. In the context of the fourth purpose, an examination of the entries in Table 4 indicates (a) that GRP, PRELAT, PRERR, and ERR were correlated significantly ($p < .05$) with LAT and (b) that AGE, GRP, SEQ, SIM, MENTAL, PRELAT, PRERR, and LAT

Table 4

Intercorrelation of Predictor and Dependent Variables

Variables	AGE	SEX	GRP	SEQ	SIM	MENTAL	PRELAL	PRERR	LAT	ERR
AGE	1.00									
SEX	.01	1.00								
GRP	-.18	-.12	1.00							
SEQ	-.16	.01	-.01	1.00						
SIM	-.02	.00	-.11	.39*	1.00					
MENTAL	-.09	.01	-.08	.80*	.86*	1.00				
PRELAT	-.01	.02	-.09	.09	.03	.06	1.00			
PRERR	-.31*	-.05	.13	-.26*	-.30*	-.34*	-.40*	1.00		
LAT	.17	.01	-.22*	.06	.17	.14	.19*	-.30*	1.00	
ERR	-.32*	-.13	.32*	-.29*	-.45*	-.44*	-.20*	.59*	-.34*	1.00

* $p<.05$

Note. Correlation coefficients of approximately .19, .22, and .24 were significant at the .05, .02, and .01 levels (two-tailed test) for a sample of 115 cases.

were significantly associated ($p < .05$) with ERR. However, there was no statistically significant correlation between SEX and either one of the two dependent variables.

Although in the stepwise regression analysis treatment group membership was the only statistically significant predictor of the LAT criterion measure ($r = .223$, $p < .05$), several predictor variables in a weighted composite contributed statistically significant proportions of variance to the ERR criterion measure including in rank order of their incremental magnitudes PRERR (covariate) scores (.345, $p < .001$), SIM (.079, $p < .001$), GRP (.053, $p < .01$), and AGE (.023, $p < .05$). At the conclusion of the stepwise regression analysis associated with the ERR criterion measure, the covariate and three previously enumerated predictor variables chosen by this procedure yielded a squared multiple correlation coefficient (R^2) adjusted for shrinkage of .483, ($p < .001$.)

Discussion

The discussion of the results of the present study is delimited to (a) main effects of VPRT, (b) the interaction effect of VPRT and sex, and (c) the stepwise multiple regression analysis.

Main Effects of VPRT

The results provided compelling evidence that participation in VPRT influenced significantly preschool children's reflectivity represented by LAT ($p < .05$) and ERR ($p < .001$). The promising success of this training program affirmed heuristic assumptions underlying VPRT--originally described by the developers of the High/Scope Cognitively Oriented Curriculum--that verbal plan and review instructions would develop disadvantaged preschoolers' ability to exercise verbal control over behavior and would promote the child's reflectivity in problem-solving situations. The study also lent support to the popularly accepted notion that private speech is teachable and that self-verbalization training facilitates self-regulation. Moreover, the findings of this investigation were consistent with those in Smilansky's (1966) study which indicated that even at preschool age, disadvantaged children might benefit from self-verbalization instruction involving the three part sequence of plan-do-review.

Interaction Effect of VPRT with Sex

Data in this study partially supported the research hypothesis that there would be no significant differences in responsiveness to VPRT by boys and girls. In contrast to Smilansky's research, the present investigation indicated a significant interaction between treatment and sex on the error measure ($p < .02$).

In view of the previous mixed findings in the literature on interaction effects of self-verbalization (Genshaft & Hirt, 1979; Smilansky, 1966), it is of some interest to examine in more detail the verbal plan and review procedure which appeared effective in decreasing boys' error scores. One possible explanation is that VPRT was successful because subjects in the present study were told to use some materials (name tabs and planning boards, accompanied by recording sheets) that would serve as cues for them to be more aware of their behavior. Self-verbalization in the present study might have made the boys self-regulative. This tentative explanation suggests that one of the most efficient ways to make impulsive boys act in a reflective manner is to use appropriate teaching materials that require reflective behaviors in conjunction with self-verbalization strategies.

Stepwise Multiple Regression Analyses

The correlational results associated with the stepwise multiple regression analyses appear to indicate that as is so often the case in evaluation studies pretest scores are highly predictive of posttest scores because of identity of content and process. Participation or lack of participation in the training program was of decisive importance in accounting for variance in both criterion measures. Although the simultaneous processing ability subtest seemed to be moderately related to the error criterion measure, it failed to be of importance in relation to the latency criterion variable. Neither chronological age nor gender of subject was of

any practical significance. Sequential processing ability failed to register any important impact on the results. Clearly, cross-validation studies are needed to ascertain whether the statistical outcomes realized in this investigation would be sustained with new samples of preschool subjects who come from economically disadvantaged homes.

Conclusions

The following conclusions were evident:

1. Participation in VPRT influences significantly the manifestation or reflectivity of disadvantaged preschool children in terms of greater latency and lower error scores.

2. VPRT procedures appear to be more beneficial to boys than to girls in reducing error scores.

3. The correlational results suggest that cognitive ability involving simultaneous processing rather than sequential processing may be important in enhancing reflectivity of children who have participated in VPRT.

4. VPRT shows promise as a cost-effective procedure for increasing reflectivity of disadvantaged preschool children in naturalistic classroom settings.

Educational Implications

The results have confirmed the common expectation that use of self-guiding speech (private speech describing one's plan and review

of past activities) is teachable and that development of the ability of disadvantaged preschool children to exercise verbal control over learning behaviors can promote their reflectivity in and attention to problem-solving tasks. VPRT would appear to provide a favorable alternative to other procedures intended to enhance reflective and self-regulating behaviors necessary to effective learning and to minimize deleterious impulsive responses especially on the part of disadvantaged preschoolers, who may be less likely to receive reinforcement for self-control than are their peers in middle-class families.

Footnote

[1]This research is based in part on a dissertation submitted by the first author in partial fulfillment of the requirements for the Ph. D. degree at the University of Southern California.

References

Adams, W. V. (1982). Strategy differences between reflective and impulsive children. Child Development, 43, 1076-1080.

Blank, M., & Solomon, F. (1969). Shall the disadvantaged child be taught? Child Development, 40, 47-61.

Borkowski, J. G., Peck, V. A., Reid, M. K., & Kurtz, B. E. (1983). Impulsivity and strategy transfer: Metamemory as mediator. Child Development, 54, 459-473.

Dittmar, N. (1976). Sociolinguisitics. London: Edward Arnold.

Drake, D. M. (1970). Perceptual correlates of impulsive and reflective behavior. Developmental Psychology, 2, 202-214.

Genshaft, J. L., & Hirt, M. (1979). Race effects in modifying cognitive impulsivity through self-instruction and modeling. Journal of Experimental Child Psychology, 27, 195-194.

Harter, S. (1982). A developmental perspective on some parameters of self-regulation in children. In P. Karoly & F. H. Kanfer (Eds.), Self-management and behavior change. New York: Pergamon Press.

Hess, R. D., & Shipman, V. C. (1965). Early experience and the socialization of cognitive modes in children. Child Development, 36, 869-886.

High/Scope Educational Research Foundation. (1979). A guide for teachers: An open framework for education. Ypsilanti, Mich.: High/Scope Educational Research Foundation.

Honmann, M., Banet, B., & Weikart, D. P. (1979). Young children in action: A manual for preschool education. Ypsilanti, Mich.: The High/Scope Press.

Kagan, J., Pearson, L., & Welch, L. (1966a). Conceptual impulsivity and inductive reasoning. Child Development, 37, 583-594.

Karoly, P., & Kanfer, F. H. (1982). Self-management and behavior change: From theory to practice. New York: Pergamon Press.

Kaufman, A. S., & Kaufman, N. L. (1983a). Kaufman Assessment Battery for Children. Circle Pines, MN: American Guidance Service.

Kaufman, A. S., & Kaufman, N. L. (1983b) Interpretive manual: Kaufman Assessment Battery for Children. Circle Pines, MN: American Guidance Service.

Kilburg, R. R., & Siegel, A. W. (1973). Differential feature analysis in the recognition memory of reflective and impulsive children. Memory & Cognition, 1, 413-419.

Luria, A. R. (1961). The role of speech in the regulation of normal and abnormal behavior. New York: Liveright.

Luria, A. R. (1982). Language and cognition. New York: Wiley.

McKinney, J. D. (1973). Problem-solving strategies in impulsive and reflective second graders. Developmental Psychology, 8, 145.

Miller, P. (1982). Amy, Wendy, and Beth: Learning language in South Baltimore. Austin: University of Texas.

Mitchell, C., & Ault, R. L. (1979). Reflection-impulsivity and the evaluation process. Child Development, 50, 1046-1049

Mumbauer, C. C., & Miller, J. O. (1970). Socioeconomic background and cognitive functioning in preschool children. Child Development, 41, 471-480.

Patterson, C. J. (1982). Self-control and self-regulation in childhood. In T. M. Field, A. Huston, H. C. Quay, L. Troll, & G. E. Finley (Eds.), Review of Human Development. New York: Wiley.

Piaget, J. (1947). The psychology of intelligence. London: Routledge & Kegan Paul.

Sewell, T. E. (1983). The thinking cast in an old mold: The Kaufman Assessment Battery for Children. Contemporary Educational Review, 2, 209-214.

Siegel, A. W., Kirasic, K. C., & Kilburg, R. R. (1973). Recognition memory in reflective and impulsive preschool children. Child Development, 44, 651-656.

Slobin, D. I. (1979). Psycholinguisitics. Glenview, Illinois: Scott, Foresman.

Smilansky, S. (1966). The effect of certain learning conditions on the programs of disadvantaged children of kindergarten age. Journal of School Psycholgoy, 4, 68-81.

SPSS (1983). SPSSx user's guide. New York: McGraw-Hill.

Vygotsky, L. S. (1962). Thought and language (E. Hanfmann & G. Vakar, Trans). Cambridge, Mass.: The M.I.T. Press (Original work published 1934).

Weikart, D. P. (1972a). Relationship of curriculum, teaching, and learning in preschool education. In J. C. Stanley (Ed.), Preschool programs for the disadvantaged. Baltimore: The John Hopkins University Press.

Weikart D. P., Hohmann, C. F., & Rhine, W. R. (1981). High/Scope cognitively oriented curriculum model. In W. R. Rhine (Ed.), Making schools more effective. New York: Academic Press.

Weikart, D. P., Rogers, L., Adcock, C. & McClelland, D. (1971). The cognitively oriented curriculum. Urbana: University of Illinois.

Wright, J. C. (1971). The Kansas Reflection Impulsivity Scale for Preschoolers (KRISP). St. Louis: CEMREL.

Wright, J. C., Gaughan, D. J., & McClanahan, R. (1978). The KRISP: A normative evaluation. Lawrence, Kansas: Kansas Center for Research in Early Childhood Education.

Zelniker, T., & Jeffrey, W. E. (1976). Reflective and impulsive children: Strategies of information processing underlying differences in problem solving. Monographs of the Society for Research in Child Development, 41, 5, Serial No. 168.